

REMARKS

Petition for Extension of Time Under 37 CFR 1.136(a)

It is hereby requested that the term to respond to the Examiner's Action of April 1, 2008 be extended one month, from July 1, 2008 to August 1, 2008.

The Commissioner is hereby authorized to charge the extension fee and any additional fees associated with this communication to Deposit Account No. 50-4364.

In the Office Action, the Examiner indicated that claims 1 through 15 are pending in the application and the Examiner rejected all of the claims.

The §112 Rejection

On page 2 of the Office Action, the Examiner has rejected claim 14 under 35 U.S.C. §112, second paragraph, as being indefinite. Applicant has amended the claim 14 to remove the phrase "and/or". Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 14 under 35 U.S.C. §112.

Rejections under 35 U.S.C. §103

On page 4 of the Office Action, the Examiner rejected claims 1-15 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,771,066 to Barnea ("Barnea") in view of U.S. Patent No. 5,132,839 to Travis ("Travis").

The Present Invention

The present invention relates to an autostereoscopic display that can be used by several observers simultaneously, a so-called multi-user display, controlled by a tracking and image controller. Disadvantages of the prior art, including restrictions to the tracking ability of the sweet-spot unit, and aberrations and poor quality and poor homogeneity of viewed images, are minimized using the claimed structure.

The Examiner Has Not Established a Prima Facie Case of Obviousness

KSR (*KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 82 USPQ2d 1385 (2007) requires that an Examiner provide “some articulated reasoning with some rationale underpinning to support the legal conclusion of obviousness.” Further, an Examiner must “identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” In addition, the Examiner must make “explicit” this rationale of “the apparent reason to combine the known elements in the fashion claimed,” including a detailed explanation of “the effects of demands known to the design community or present in the marketplace” and “the background knowledge possessed by a person having ordinary skill in the art.”

The Examiner has not met these requirements. The present claimed invention includes, among other elements, “a field lens which is disposed behind the imaging means in the direction of light propagation”. The Examiner states that Barnea discloses, in Fig. 2, “a field lens 20 which is disposed behind the imaging means 21 in the direction of light propagation.” Applicant respectfully traverses this assertion of the Examiner. The three dimensional display of Barnea

does not disclose a field lens in Fig. 2. The component 20 of Fig. 2 of Barnea is quite clearly the *light modulator* for displaying the image, rather than a field lens. Among other ways, this fact can be recognized by the connection shown between component 20 and the control system 30, embodied analogously in Fig. 1 as light modulator 22 connected to control system 30. A field lens would not have such a connection.

Also it is explicitly described in col. 4 lines 40-45 of Barnea that lens 20 in Fig. 1 has been replaced by a lenticular array 21 in Fig. 2. Furthermore, the lens 20 in Fig. 1 is not a field lens but a normal imaging lens without a field lens function.

The present claimed invention is also a *multi-user* display. With the multi-user display of the present invention, multiple users can see a three dimensional image at the same time. The autostereoscopic display described in Barnea is designed only for a single user (col. 3 lines 3-16; claim 1).

Another claimed difference between the present invention and Barnea is the principle of operation of the present invention in view of the claimed structure. Col. 3 line 64 through Col. 4 line 2 of Barnea discloses that the two stereo images of one view of a 3D object for the left and the right eye are displayed sequentially only in different portions of the SLM 22. Synchronously with the images the light is emitted by spots 32 and 34 or by vertical lines to illuminate said portions of the SLM 22 and then directed to the detected position of the user.

In the present claimed invention, the right and left images of a view of the 3D object are, however, displayed on the entire area of the SLM. The sweet-spot unit sequentially generates a sweet-spot extended like the eye pupil for the left and right observer eye. Thereby the entire area of the SLM is illuminated, not just portions as described in Barnea. Synchronously with the

illumination, the stereo images of the 3D object for the left and right eye are displayed sequentially on the entire area of the SLM. This happens very fast and the user sees the image of the 3D object three dimensionally from the sweet-spot even when he changes position laterally.

Using the present claimed invention, sweet-spots are generated for multiple users and stereo images are displayed for multiple users sequentially. The display is, as noted above, a multi-user display. The display in Barnea cannot achieve this. Because of the absence of a field lens in Fig. 2 of Barnea, bundles of rays coming from the outside lenses of the lenticular array cannot superimpose in the eye position. In fact, Barnea is an example of the prior art cited in the background section of the present application, and Barnea thus has the same problems and aberrations which are described in the prior art section of the present application.

The addition of Travis does not render obvious the present claimed invention.

The three dimensional display of Travis discloses either a field lens, a lenticular array or a would-be combination of a lenticular array with a field lens in Fig. 6, as an imaging means.

The field lens 1 and the lenticular array 3 as they are shown and described in Fig. 6 of Travis have discreet and unrelated functions. The beam-scanner 16 directs the light from laser 15 only to definite lenses of the lenticular array 3. The components 15, 16 and 3 have the function of an illumination matrix providing light in definite areas and directions. They are similar to with components 120 and 130 of the present application. Given that the beam-scanner 16 is not arranged in the first focal plane of the lenticular array 3, parallel bundles of rays, as are generated by the configuration of the claimed invention herein, are not generated by Travis. The lenticular array 3 is definitely a part of the illumination matrix and not of the imaging device analogous to claim 1 of the present application. Field lens 1 is thus the sole imaging means in Travis.

Figure 6 of Travis also illustrates at least one illumination element per eye position, lens element and line; this is also different than the claimed invention herein. Travis describes an autostereoscopic display to be used only by a single user. Beginning at col. 6, line 7 in Travis, it is described how a user can see different images in different positions. In the description in col. 7 lines 54-60 is mentioned the possibility of seeing the same images by multiple users. But this can take place only if the images and the spots of light are generated simultaneously. To one skilled in the art is clear that with an increasing number of simultaneously generated images, the resolution of the 3D display decreases. That is why Travis describes no concrete solution for a multi-user display, but only for a multi-view display for several users. No position tracking is disclosed or suggested. If the user moves to other positions he can see other images of the 3D object taken from different angles. This is not the object nor the result of the present invention. In addition, unlike the present invention (in which the sweet spot is generated for several positions of users, in Travis, no such sweet spot is generated.

The principle of displaying an image in Travis different is also different than in the present invention. A special combination of a sequential and a simultaneous displaying of mostly more than two views of a 3D object is used in Travis. The present application works by only sequentially displaying the stereo images.

An object of the present application is to enlarge the tracking range for multiple users, to reduce aberrations at the same time and to enhance the quality of displaying 3D objects and of illuminating the display, realizing all these features in a flat design. This is done with the imaging device of the claimed invention by the claimed combination of a field lens and a lenticular array.

The imaging device of the present invention has an advantage in that all illumination elements activated independently from the position of the lens elements generate only nearly collimated, parallel bundles of rays.

The claimed field lens images these bundles of rays as directed light onto the eyes of observers. A significant number of illumination elements are assigned to every lens element. If an observer changes his/her position laterally or normally to the display, other illumination elements assigned to a lens element can be activated for the new position, without disturbing the quality of the displayed 3D object. This is achieved by matching of the focal distance of the field lens and the lens elements of the lenticular array. The aberrations are decreased and the tracking range is enlarged at the same time. All of these aspects are claimed in the independent claim of the present invention, and none of these claimed elements are taught or suggested by the cited references, taken alone or in combination. Accordingly, the present application patentably defines over to Barnea and Travis, taken alone or in combination..

Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 1-15 under 35 USC §103.

Conclusion

The present invention is not taught or suggested by the prior art. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of the claims. An early Notice of Allowance is earnestly solicited.

The Commissioner is hereby authorized to charge the extension fee and any additional fees associated with this communication to applicant's Deposit Account No. 50-4364.

Respectfully submitted

August 1, 2008
Date

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